Moose

IN BRITISH COLUMBIA

Ecology, Conservation and Management

BRITISH COLUMBIA
Ministry of Environment, Lands and Parks

Adult bulls stand nearly 2 metres tall at the shoulder and have the most massive antlers of any member of the deer family.

INTRODUCTION

The largest members of the deer family (Cervidae), Moose are found in northern forests across Eurasia, from Scandinavia and Poland to eastern Russia, and across North America from Alaska and British Columbia to Labrador and Nova Scotia. The same species, *Alces alces*, occurs on both continents. This pattern of distribution is called circumboreal. Adult bulls stand nearly 2 m tall at the shoulder and have the most massive antlers of any member of the deer family. Long a critical source of food, clothing, and implements for First Nations, the majestic Moose also fascinated early explorers, whose writings included many accounts of Moose. Moose have survived the advance of civilization rather well, and an estimated 800,000 to 1.2 million live in North America today.

TAXONOMY

Order
Artiodactyla (Even-toed ungulates)

Family
Cervidae (Moose, Elk, Caribou, Deer)

Genus
Alces

Species
alces

Subspecies
andersoni (Northwestern Moose)
gigas (Alaskan Moose)
shirasi (Shiras' Moose)

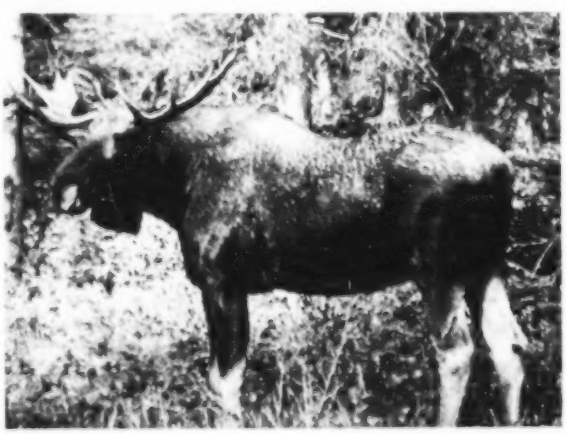
EVOLUTION AND APPEARANCE

Moose are relative latecomers to North America. They probably arrived from Asia via the Bering land bridge during the most recent (Wisconsin) glacial period, when sea levels were lower than today. During that period, Moose lived in unglaciated parts of Alaska, then spread south and east as the ice sheets melted. British Columbia has three subspecies of Moose. All three subspecies are similar in appearance, but those in southeastern British Columbia have the smallest bodies and antlers. The biggest Moose reside in northern British Columbia.

Moose look noticeably different from other native hoofed mammals (ungulates). They are larger and have longer legs, a shoulder hump, and a dark brown to blackish coat. They have no rump patch, but they have a bell of skin and hair under the throat and a large, overhanging upper lip. In autumn, adult cows weigh on average about 340 to 420 kg; adult bulls weigh 450 to 500 kg. The maximum recorded weight is 595 kg, but some bulls are undoubtedly heavier. Moose have long legs to help them travel through fallen timber, muskeg, and deep snow. Their winter pelage of long guard hairs and undercoat of fine wool allows them to survive in the coldest climates on earth.

The Moose is one of the most widely distributed ungulates in British Columbia.

Only male Moose have antlers, which they grow and shed each year. The antlers begin to develop in late April or early May. While they are growing, the antlers are covered with furry velvet, which contains their nourishing blood supply. In British Columbia, Moose antlers reach full size by early September. Then the velvet dries, and the Moose rubs it off against trees or shrubs. Yearling bulls grow small antlers with two or three points on each side but with no significant palm. The antlers of older Moose are usually palmate, but they vary greatly in size and number of points and are not a reliable means of



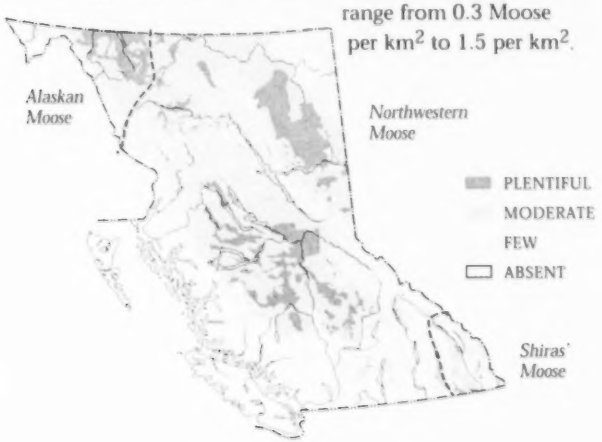
L. Tooze

determining the Moose's age. However, antlers usually continue to grow until the Moose is about ten years old. In their prime, bulls may carry split-palm or butterfly antlers with a total spread of up to 1.8 m. On prime bulls, the lower or brow palm protects the face during head-to-head fights. In British Columbia, Moose shed their antlers between mid-November and March. The older bulls shed earliest, and by March only the yearlings may still have antlers.

DISTRIBUTION AND ABUNDANCE

Moose are one of the most widely distributed ungulates in British Columbia. Found across almost the entire interior of the province, they are most abundant in the central and sub-boreal interior, the northern boreal mountains, and the boreal plains of northeastern British Columbia. Moose are also common in mountainous valleys, except for a few dry southern valleys like the Thompson and Okanagan. Moose are usually absent from coastal regions, but they penetrate as far as the tidewater at the heads of several inlets from Bute Inlet northward. Moose survive in these areas by moving along the rivers that cut through the Coast Range and by foraging on dense browse stands that occur at or near the estuaries of those rivers. Today, British Columbia has about 170,000 Moose. Over 70 percent live in northern British Columbia and the rest in the Cariboo-Chilcotin, Thompson-Okanagan, and Kootenay regions. Population densities vary greatly from place to place, mostly in response to snow depth and the supply of winter browse. In winter, typical population densities in British Columbia range from 0.3 Moose per km^2 to 1.5 per km^2.

HOOF PRINTS



LIFE HISTORY

Moose are essentially solitary animals that move about within familiar summer and winter home ranges. In a given season, their home range seldom exceeds 5 to 10 km^2. Their annual home range is much larger, particularly for migratory Moose. Moose do not defend their home range and do not have year-round dominance hierarchies like the more social Elk and Bighorn Sheep. In expansive northern shrublands, Moose commonly form groups of up to eight to ten during the rutting period. This habit is less common in forested habitats. When several Moose are attracted to a mineral lick or a superior feeding place, they may form a small group, but these groups lack a social basis. The Moose's only lasting social bond is the bond between mother and calf, and it lasts for only a year. During that time the cows protect the calves from predators and lead them to the best habitats.

Moose do not have year-round dominance hierarchies like the more social Elk and Bighorn Sheep.

In British Columbia, Moose mate from September to November, but more than 80 percent of calves are conceived during the first estrus period (heat), which occurs during two weeks in late September and early October. Cows that do not conceive during the first estrus have second or third estrus periods at about 25-day intervals. At rutting time, cow Moose emit a long, quavering moan that is audible for up to 3 km. This call can attract a bull or bulls in forested terrain where visual contact is limited. Several cows often gather around a prime bull, or two fighting bulls, and wallow in the urine-soaked rutting pits the bulls have made. The bulls do not try to form a harem, but prime bulls of equal size engage in serious shoving matches in which they lock antlers. These fights seem largely intended to show the attending cow or cows the bull's superiority so that the cows can choose the best mate. Unlike other ungulates, the Moose cows may be quite aggressive toward one another, and receptive females actively choose their mate, rather than leaving the choice to the males.

In late May and June, after a gestation period of eight months, the birthing period approaches. Pregnant females seek seclusion and chase away their young of the previous year. Under normal conditions, single births are the rule, and only 10 to 20 percent of adult cows produce twins. Newborn calves typically weigh 11 to 16 kg and can stand on their first day.

Moose generally give birth lying down and may nurse their young in that position.

The cow licks them thoroughly and regularly, which helps to establish the cow-calf bond. Cows produce at least 150 l of milk from June to September, and this is very important for the calves' early nutrition. Calves start eating vegetation when they are two weeks old but are not completely weaned until autumn. They grow rapidly during their first summer and weigh 135 to 180 kg by early winter.

Female Moose can breed as yearlings if habitat conditions are good, but they usually conceive for the first time as two-year-olds. Most cows produce one or two calves every year during their lifetime. Yearling bulls are capable of breeding, but older bulls are responsible for most of the successful breeding.

The main natural causes of death in Moose are starvation and predators. Humans are responsible for losses from hunting and from collisions with trains and highway vehicles. During the most severe winters when the snow cover is unusually deep and long-lasting, Moose are in poor physical condition and usually die from starvation or attacks by wolves. Black Bears can take significant numbers of newborn calves. Grizzly Bears also kill Moose from spring through fall, and Cougars occasionally kill Moose in the southern interior.

The most important parasites of Moose are winter ticks, liver flukes, and tapeworm cysts. Moose that are weakened from malnutrition occasionally die from heavy tick infestations, but most Moose in British Columbia do not die from parasites.

ECOLOGICAL RELATIONSHIPS

The boreal and mountain Moose habitats usually have significant amounts of snow in winter. Moose are well adapted to snowy regions because of their long legs, which help them to travel through deep snow. Field studies have shown that Moose have little or no difficulty moving around in snow up to 40 cm deep and only slight difficulty in snow depths of 40 to 70 cm deep. The density of snow can also affect their ability to move around.

UNDER NORMAL CONDITIONS, SINGLE BIRTHS ARE THE RULE ALTHOUGH TWIN CALVES ARE NOT UNCOMMON. *BC Gov.*

To a large extent, the depth and the duration of snow cover determine the seasonal movements of Moose. In mountainous regions of British Columbia, Moose usually migrate between winter-spring ranges in valley bottoms and higher-elevation summer ranges, but some Moose remain in the valleys year-round. In autumn, they are able to stay on high-elevation ranges much longer than Elk, deer, or mountain sheep. They return to their valley-bottom ranges gradually, and if the snowfall is light, they may stay on mid-elevation ranges until late winter. On plateaus, Moose usually spread out over the landscape in summer and are strongly attracted to lake shores, swamps, and Beaver ponds. In winter they tend to concentrate along river valleys that cut through the plateaus and in burns, logged areas, and wetland complexes. In spring, when the snow has become patchy and no longer prevents them from traveling, many Moose move quickly to spring ranges, which are essentially extensions of their winter ranges.

Moose are better adapted to a diet of coarse woody browse than are other hoofed animals within their range.

Because Moose are such large animals, they must eat up to 20 kg of food every day in winter in order to meet their energy needs. They need highly concentrated foods in order to replace the energy they use in moving through snow to find scattered foraging sites. In winter, Moose need the dense browse stands that occur mostly along rivers, around wetlands, in burns and logged areas, on the lower parts of avalanche tracks, and in the subalpine Spruce-Willow-Birch Zone.

In British Columbia, as elsewhere, Moose depend primarily on willows for winter food. Red-osier dogwood, cottonwood, paper birch, aspen, high-bush cranberry, false box, and subalpine fir are also important foods. Moose also strip bark from willows and poplars in winter. In summer, aquatic plants like horsetail, burweed, and submerged pondweeds are important foods. Moose also eat the new leaves on a variety of shrubs and herbs in summer.

Moose are better adapted to foraging on coarse woody browse than other hoofed animals that share their range. They can reach twigs up to 2.5 m above the ground, chew off large-diameter twigs, and often break down branches with their jaws to get at tips that are out of reach. Moose commonly winter in areas with 50 cm or more of snow cover, which usually excludes other ungulates except Caribou. Caribou move about more widely than Moose in winter,

pawing through snow to obtain lichens in northern British Columbia and walking on top of snow to reach tree lichens in the southeast. Moose are therefore adapted to a niche where competition from other ungulates is minimal.

VALUES AND USES

First Nations used Moose extensively before the European explorers arrived. In parts of British Columbia, Moose were the main source of meat for indigenous peoples. They used Moose hides for moccasins, clothing, and shelter and made tools and implements from the bones and antlers. According to historical records, some First Nations in northern British Columbia starved when Moose were scarce. Early explorers and the first settlers also relied heavily on Moose for food. Explorers traded Moose hides at Hudson Bay company posts and used dried Moose meat to provision the trading posts during winter. Moose continue to be an important part of the economy and diet of many northern and rural people, including First Nations.

In recent decades, Moose has been one of the most important game species in British Columbia, providing more meat than all other ungulates combined. The Moose is also a valued trophy animal. The annual provincial harvest of 8000 to 14,000 Moose has generated considerable license revenue for management, habitat enhancement, and enforcement programs, as well as income for guide-outfitters and their assistants in British Columbia's northern communities. Other benefits from Moose hunting include several hundred thousand days of recreation for hunters and the meat the successful hunters take home.

The Moose also has aesthetic value as a symbol of the northern wilderness. Many outdoor recreationists have thrilled at the sight of a mature bull or cow with its calf in a natural setting. Canoers and river rafters often see Moose along rivers and around lake shores in summer. Canoeing in Bowron Lakes Provincial Park or along the Crooked River north of Prince George is also a good way to see Moose. Along the Yellowhead route, Moose are frequently visible in summer at Moose Lake in Mount Robson Provincial Park and in Cranberry Marsh near Valemount. In winter they often appear at the Grove

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DURING SUMMER, MOOSE ARE OFTEN SEEN FEEDING ALONG LAKE SHORES, SWAMPS AND BEAVER PONDS. *L.R. Ramsay*

Burn east of Prince George, which has an observation tower for viewing Moose. Along the Alaska Highway, good places to spot Moose include Muncho Lake and the wetlands in Liard Hotsprings Provincial Park.

CONSERVATION

During the 1900s, human activities have reduced the land area in British Columbia that can support Moose. Land settlement and farming have mainly affected Moose habitat in the Peace River and Cariboo regions. Hydroelectric reservoirs have flooded key winter ranges in the Peace River area (Williston and Site One reservoirs), along the Columbia River (Mica and Revelstoke reservoirs), and in the upper Nechako watershed. Although we will never know the actual carrying capacity of those flooded habitats, we can be sure that they would have supported several thousand Moose. Floating debris also prevents Moose from migrating across some reservoirs.

Each year, hundreds of Moose die on highways and railway lines, particularly along the Yellowhead corridor. The take by resident hunters, although substantial, is regulated and is not a major conservation concern. However, uncontrolled harvesting from illegal

poaching and legal First Nations hunting is a major concern in some areas. The recent proliferation of logging roads and other access roads in many Moose habitats needs to be controlled because it, too, could lead to over-harvesting of Moose.

Since 1981, the Ministry of Environment, Lands and Parks has undertaken a number of Moose habitat enhancement projects in central and northern British Columbia. The Habitat Conservation Trust Fund provided financial support, derived from a portion of hunting license revenues, for these projects. The projects were aimed at increasing the supply of woody browse on Moose winter ranges. They involved controlled burns to produce early successional stages, bulldozing over-mature browse stands to rehabilitate them, and hand-cutting decadent willows to stimulate sprouting. In most cases, these projects produced a great deal more browse and improved the range's capacity to sustain Moose. BC Hydro compensation programs for the Columbia Basin and Williston Reservoir are funding research-related to habitat enhancement for various wildlife species, and this should also benefit Moose in the future. However, these enhancement projects cover only a small part of British Columbia's total Moose range.

Logging is now widespread on Moose ranges in British Columbia. Logging may temporarily benefit Moose when willows and other shrubs become abundant in cutblocks, but removing too much forest cover can be detrimental. Moose need nearby cover to hide from predators and hunters, for shade in hot weather, and for shelter during blizzards. Forest harvesting and silviculture prescriptions on important Moose ranges must recognize the needs of Moose.

In future, increasing human populations and resource development in central and northern British Columbia could have adverse effects on Moose habitat. It will require comprehensive land-use planning to ensure that these developments have as little impact as possible on Moose populations. Carefully considered approaches to land-use planning, forest practices, and habitat enhancement can help maintain today's Moose populations well into the future.

MOOSE ARE WELL ADAPTED TO SNOWY REGIONS BECAUSE OF THEIR LONG LEGS, WHICH HELP THEM TRAVEL THROUGH DEEP SNOW. *BC Gov.*

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